

SECRET

21 September 1961

MEMORANDUM FOR: THE RECORD

SUBJECT : HRT-2 Antenna Tests [redacted]

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Introduction

1. [redacted] has been given the problem to design and construct an antenna for the HRT-2 which will out-perform the AN/A-42 in the following ways:

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- a. be more efficient
- b. be easier to erect
- c. be capable of broad band operation with no tuning required over a 1600-1750 Kc frequency range.

2. The purpose of the tests [redacted] on 13 Sept. was to check one of [redacted] early designs to determine if it was meeting any of the defined goals. Attending the tests were the following:

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Results

1. A Helicopter, HH-1, was used for the tests and the ADF in the craft was the AN/APN-59. Unfortunately, only a limited amount of testing was performed due to weather conditions. The table below shows the data obtained.

<u>Altitude</u>	<u>Antenna</u>	<u>Frequency</u>	<u>Maximum Range for ADF</u>
500 ft.	A-42	1700 kc	10 miles
500 ft.	TEL	1700 kc	18 miles
500 ft.	TEL	1650 kc	16 miles

2. The [redacted] antenna was designed to operate at 1700 kc and it was hoped that tests could be performed over the range of 1600 to 1750 kc to determine the effect of the detuning. Tests were made only at 1650 and 1700 kc due to the time limitation. The mileage data shown in the table are approximations since the maximum range points were not pinpointed on maps, but rather were estimated by the pilot who was quite

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familiar with the area. However, in all, these tests were useful in that they did indicate that the new antenna design was more efficient than the AN/A-42. The degree of this improvement would have to be checked more thoroughly under more controlled tests. Little information was obtained regarding the broad band capability of the antenna, but this will be determined in later tests after a more refined antenna is constructed.

3. It was demonstrated that one man could erect the [] antenna rather handily even though this antenna is about 35 feet high. A good feature of this antenna is that the antenna is a continuous piece of braid which is inside some fiberglass and epoxy tubing. This means that it is not necessary to have a good electrical connection between the different sections of the antenna thereby eliminating the necessity of screw type fittings. This antenna is erected by simply sliding the individual tubing sections together. One problem did arise in the demonstration, and that was the degree of spring loading necessary on the braid antenna. In the demonstration the braid broke when disassembling the sections, but the redesign of this portion of the antenna should not present a serious problem. In fact, [] personnel stated they were not completely satisfied with this particular type of spring arrangement but used it only for expediency for these tests.

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Recommendations

1. Results were conclusive enough to warrant [] designing a more refined antenna. In the design of this antenna, careful consideration should be given to the mechanical problems associated with this design especially the spring loading of the antenna proper.

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2. In order to facilitate future tests, the loading coil should be such that it can either be used in a broad band position or be capable of being tuned for specific frequencies in the 1600 to 1750 kc band.

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TSD/SB/ES

Distribution:

- Orig - C/TSD/[]
- 1 - AC/TSD/ACB
- 1 - S-7.7.4/1
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TSD/SB/NRG:eip (21 Sept **SECRET**)